BUREAU OF WATER

South Carolina Department of Health and Environmental Control

SHELLFISH MANAGEMENT AREA 17

2003 ANNUAL UPDATE

Shellfish Sanitation Program

Water Monitoring, Assessment and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

July 2003

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South Carolina Department of Health and Environmental Control

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2003 ANNUAL UPDATE

[Data Thru December 2002]

Shellfish Management Area 17
Shellfish Sanitation Program

Preparers: David Payne, District Program Manager
Shellfish Sanitation Program
Low Country Environmental Quality Control District
104 Parker Drive
Burton, SC 29906

Reviewers/Editors:
David G. Baize, Division Director (and)
Charles Newell, Shellfish Program Manager
Water Monitoring, Assessment, and Protection Division
Environmental Quality Control - Bureau of Water
2600 Bull Street
Columbia, South Carolina 29201

David G. Baize, Division Director
Water Monitoring, Assessment, and Protection Division
Environmental Quality Control - Bureau of Water

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ANNUAL UPDATE
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SCDHEC EQC Bureau of Water

Data Inclusive Dates:
01/01/00 thru 12/31/02

Classification Change:
__Yes X No

Shoreline Survey Completed: Yes

(I)ncreased/(D)ecreased/(N)one:
N Approved
N Cond.
N Restricted
N Prohibited

Prior Report & Date: Annual -2002

SUMMARY

Widening of S.C. Highway 170 and construction of new bridges over the Broad and Chechessee Rivers is progressing. There will be no direct runoff from the bridges. Stormwater will be collected and stormwater treatment devices will be utilized.

Water quality at all stations in Area 17 meets the statistical criteria for an Approved classification. The harvest classification boundaries will remain the same as in the previous Annual Update.

INTRODUCTION

PURPOSE AND SCOPE

The authority to regulate the harvest, sanitation, processing and handling of shellfish is granted to the South Carolina Department of Health and Environmental Control by Section 44-1-140 of the Code of Laws of South Carolina, 1976, as amended. The Department promulgated Regulation 61-47 which provides the rules used to implement this authority and outlines the requirements applied in regulating shellfish sanitation in the State This regulation specifically addresses classification of shellfish harvesting areas and requires that all areas be examined by sanitary and bacteriological surveys and classified into an appropriate shellfish harvesting classification.

The National Shellfish Sanitation Program (NSSP) Guide For The Control Of Molluscan Shellfish is used by the United States Food and Drug Administration (USFDA) to evaluate state shellfish sanitation programs. The NSSP Model Ordinance requires that a sanitary survey be in place for each growing area prior to its use as a source of shellfish for human consumption and prior to the area? s classification as Approved, Conditionally Approved, Restricted, or Conditionally Restricted. Each sanitary survey shall be updated on an annual basis and accurately reflect changes which have occurred

within the area. Requirement of the annual reevaluation include, at a minimum, field observations of pollution sources, an analysis of water quality data consisting of the past year? s data in combination with appropriate previously collected data, review of reports and effluent samples from pollution sources, and review of performance standards for discharges impacting the growing area. A brief report documenting the findings shall also be provided.

The following criteria consistent with the NSSP Model Ordinance and S. C. Regulation 61-47 are used in establishing shellfish harvesting classifications:

Approved - Growing areas shall be classified Approved when the sanitary survey concludes that fecal material, pathogenic microorganisms, and poisonous or deleterious substances are not present in concentrations which would render shellfish unsafe for human consumption. The Approved area classification shall be designated based upon a sanitary survey which includes water samples collected from stations in the designated area adjacent to actual or potential sources of pollution. For waters sampled under adverse pollution conditions, the median fecal coliform Most Probable Number (MPN) or the geometric mean MPN shall not exceed fourteen per one hundred milliliters, and not more than ten percent of the samples shall exceed a fecal coliform MPN of forty-three per one hundred milliliters (per five tube decimal dilution). For waters sampled under a systematic random sampling plan, the geometric mean fecal coliform Most Probable Number (MPN) shall not exceed fourteen per one hundred milliliters, and the estimated ninetieth percentile shall not exceed an MPN of forty three (per five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP Guidelines.

Conditionally Approved - Growing areas may be classified Conditionally Approved when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be adopted by the Department prior to classifying an area as Conditionally Approved. Where appropriate, the management plan for each Conditionally Approved area shall include performance standards for sources of controllable pollution, e.g., wastewater treatment and collection systems, evaluation of each source of pollution, and means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate.

Restricted - Growing areas shall be classified Restricted when sanitary survey data show a limited degree of pollution or the presence of deleterious or poisonous substances to a degree which may cause the water quality to fluctuate unpredictably or at such a frequency that a Conditionally Approved classification is not feasible. Shellfish may be harvested from areas classified as Restricted only for the purposes of relaying or depuration and only by special permit issued by the Department and under Department supervision.

For Restricted areas to be utilized as a source of shellstock for depuration, or as source water

for depuration, the fecal coliform geometric mean MPN of restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Conditionally Restricted - Growing areas may be classified Conditionally Restricted when they are subject to temporary conditions of actual or potential pollution. When such events are predictable, as in the malfunction of wastewater treatment facilities, non-point source pollution from rainfall runoff, discharge of a major river, or potential discharges from dock or harbor facilities that may affect water quality, a management plan describing conditions under which harvesting will be allowed shall be prepared by the Department prior to classifying an area as Conditionally Restricted. Where appropriate, the management plan for each Conditionally Restricted area shall include performance standards for sources of controllable pollution (e.g., wastewater treatment and collection systems and an evaluation of each source of pollution) and description of the means of rapidly closing and subsequent reopening areas to shellfish harvesting. Memorandums of agreements shall be a part of these management plans where appropriate. Shellfish may be harvested from areas classified as Conditionally Restricted only for the purposes of relaying or depuration and only by permit issued by the Department and under Department supervision. For Conditionally Restricted areas to be utilized as a source of shellstock for depuration, the fecal coliform geometric mean MPN of Conditionally Restricted waters sampled under adverse pollution conditions shall not exceed eighty-eight per one hundred milliliters and not more than ten percent of the samples shall exceed a MPN of two hundred and sixty per one hundred milliliters for a five tube decimal dilution test. For waters sampled under a systematic random sampling plan, the fecal coliform geometric mean MPN shall not exceed eighty-eight per one hundred milliliters and the estimated ninetieth percentile shall not exceed an MPN of two hundred and sixty (five tube decimal dilution). Computation of the estimated ninetieth percentile shall be obtained using NSSP guidelines.

Prohibited - Growing areas are classified Prohibited if there is no current sanitary survey or if the sanitary survey or monitoring data show unsafe levels of fecal material, pathogenic microorganisms, or poisonous or deleterious substances in the growing area or indicate that such substances could potentially reach quantities which could render shellfish unfit or unsafe for human consumption.

BACKGROUND INFORMATION

Shellfish Management Area 17 consists of approximately 67,015 acres of shellfish growing area habitat located in Beaufort county. Area 17 consists of the Broad River and its tributaries including Whale Branch, Boyds, Euhaw, Hazzard, Habersham, Archer, Ribbon, and Ballast Creeks and Chechessee River. The headwaters of the Broad river is formed by the confluence of the Coosahatchie, Pocotaligo, and Tullifinny Rivers, which originate west of Interstate 95/Highway 17 as freshwater rivers, draining large areas of wetlands.

The area's northern boundary begins at the intersection of state road 13 and Highway 462, crosses the Coosahatchie and Pocotaligo Rivers just upstream of their confluence with Broad River and ends at the Area 14 boundary (at the railroad trestle). The eastern boundary follows the railroad track and a portion of Highway 21, crossing Port Royal Island and Parris Island. The boundary divides the creeks that drain to Broad River from those that drain to Beaufort River in area 15. The southern boundary is the Atlantic Ocean at the mouth of Port Royal Sound. The western boundary begins at the mouth of Port Royal Sound and crosses the mouths of Skull Creek, Mackey Creek, and follows the western shore of Chechessee River to Highway 170. The line then turns west to the intersection with Highway 278 and follows Highway 278, then 462 to the intersection with state road 13.

The majority of the shellfish resources and harvesting activity are located from Euhaw Creek and Habersham Creek south to the mouth of Port Royal Sound.

The harvesting classifications of Area 17 prior to this survey were as follows:

Prohibited: (Administrative closure)

1) USMC/Laurel Bay WWTP closure zone- Broad River, 2 miles north and south of the Outfall;
2) Archers Creek, from 1000 feet west of the bridge to Parris Island;
3) Hazzard Creek, from station 17-25(formerly 17-24) to the boundary of Area 17 at Highway 278.

Restricted/No depuration: None

Restricted:

Ballast Creek, from the boundary with Area 15 to its confluence with Broad River.

Conditionally Approved: None

Approved: The remaining waters of Area 17.

Station Addition/Deactivation/Reactivation /Modification: None

The shellfish industry in South Carolina is based mainly on the harvest of the eastern oyster (*Crassostrea virginica*) and hard clams (*Mercenaria mercenaria*). Areas in South Carolina designated for commercial harvest by the South Carolina Department of Natural Resources (SCDNR) include state shellfish grounds, culture permits, mariculture permits, and Kings Grant areas.

There are four shellfish culture permits in Area 17. Culture permits 054 and 063 are leased to L.P. Maggioni & Company; 062 to Lemon Island Marina; and 057 is leased to T.M. Bailey. The general public is allowed to harvest on three state shellfish grounds in Area 17. State shellfish ground

058 is located in Chechessee Creek; 068 in Broad River; and 064 is on Parris Island. Recreational harvesting is allowed for clams and oysters in these areas, and commercial harvesting by licensed individuals is currently allowed, subject to seasons established by SCDNR. Recreational harvesting only is allowed on the Chechessee Bluff Public Shellfish Ground (R-061). Mariculture Permit M-064 is located adjacent to State Shellfish Ground 064 on Parris Island and is leased to Perry Hall.

Shellfish harvesting season in South Carolina extends from September 16 through May 15, although actual dates may vary. SCDNR has the authority to alter the shellfish harvesting season for management purposes. The South Carolina Department of Health and Environmental Control has the authority to prohibit shellfish harvesting when necessary to ensure that all shellfish harvested in South Carolina waters are safe for human consumption.

POLLUTION SOURCE SURVEY

SURVEY PROCEDURES

Shoreline surveys of Area 17 were conducted by the Low Country District Shellfish Sanitation staff**,** by watercraft, vehicle, and on foot, during the survey period and are ongoing.

POINT SOURCE POLLUTION

Major sources of actual or potential pollution (See Figure 4):

PERMITTED SOURCES	PERMIT #/TYPE/ DISCHARGE
BJW&SA Palm Key WWTP	ND0064513/ 0.066 MGD/spray irrigation
USMC/Beaufort Air Station/Laurel Bay	SC0000825-002/ 0.75 MGD/Broad River

A. Municipal and Community Waste Treatment Facilities - The USMC/ Beaufort Air Station / Laurel Bay WWTP (O.75MGD) is the only point source discharge within the boundaries of Area 17. The plant consists of a bar screen, primary and secondary clarifiers, trickling filters, sludge digester, and post treatment chlorination/ dechlorination.

On February 12, 2002, a sewage spill at Parris Island resulted in the precautionary closure of State Shellfish Ground 064. Samples were collected on February 21 and the area was re-opened on February 22.

With the exception of Laurel Bay and Parris Island, most of the area's homes utilize septic tanks for waste disposal.

A Portion of Archer Creek within Area 17 is administratively Prohibited as a precaution due to the creek's ultimate connection with the Prohibited portions of Battery Creek in Area 15

B. **Industrial Discharges** - There are no permitted industrial dischargers in Area 17.

C. **Marinas** - S.C. Regulation 61-47, Shellfish defines Marina as "any water area with a structure (docks, basin, floating docks, etc.) which is: 1) used for docking or otherwise mooring vessels; and, 2) constructed to provide temporary or permanent docking space for more than ten boats, or has more than 200 linear feet of docking space." There are no marinas located in Area 17. There are numerous private boat docks throughout Area 17.

D. **Radionuclides** - Sources of radionuclides have not been identified within Area 17, and radionuclide monitoring has not been conducted. No other sources of poisonous or deleterious substances have been identified within the area.

NONPOINT SOURCE POLLUTION

A. **Stormwater** - Sampling at stations 19 and 19A was discontinued in February 1998. Stations 19 and 19A were located outside of the management boundary for Area 17. These stations were created to monitor impact from stormwater runoff from Hickory Hill landfill into Hazzard Creek. The landfill has a stormwater retention pond with a discharge to a ditch to Hazzard Creek. Although the retention pond discharges infrequently, as stormwater is stored on site, the upper reaches of Hazzard Creek are classified as Prohibited.

Stormwater runoff often impacts water quality by transporting fecal coliform bacteria (and other pollutants) from land to the shellfish growing area. Stormwater from roads, residences, and agricultural land is directed to the lowest point of elevation that is typically the nearest creek or marsh. In addition, there are freshwater wetland areas, ditches, and impoundments which drain into tidal creeks.

Most land disturbing activities in South Carolina must comply with the Stormwater Management and Sediment Reduction Act of 1991. The final regulations, effective on June 26, 1992, establish the procedures and minimum standards for a statewide stormwater management program. For activities in the eight coastal counties, additional water quality requirements are imposed. For all projects, regardless of size, which are located within one-half mile of a receiving water body in the coastal zone, the criteria for permanent water quality ponds having a permanent pool is that they are designed to store the first ? inch of runoff from the entire site over a 24-hour period or storage of the first one inch of runoff from the built-upon portion of the property, whichever is greater. Storage may be accomplished through retention, detention, or infiltration systems, as appropriate for the specific site. In addition, for those projects that are located within 1000 feet of shellfish beds, the first one and one half inches of runoff from the built-upon portion of the property must be retained on site. Since 1992, these regulations have been applied to the development of residential subdivisions, golf courses, and business areas.

B. **Agricultural Waste** - Small populations of cattle and horses are found throughout area 17 mainly in the northern and western sections.

C. Individual Sewage Treatment and Disposal (ISTD) Systems - Homes and businesses in Area 17 utilize ISTDs or sewer. Most new subdivisions utilize sewer.

D. Wildlife and Domestic Animals - This area supports populations of white-tailed deer, raccoons, wading birds, migratory waterfowl, and other wildlife, which may contribute to fecal coliform levels in some areas. Domestic animals present in the area include dogs, cats, horses, and goats.

E. Boat Traffic - There are three public boat landings in Area 17.

F. Hydrographic and Habitat Modification - Hydrographic and habitat modification in estuarine areas requires both State and Federal approval.

G. Marine Biotoxins - There have been no documented occurrences of toxic algae affecting water quality in Area 17. The Department participates in a State Task Force on Toxic Algae and maintains a toxic algae emergency response team.

HYDROGRAPHIC AND METEOROLOGICAL CHARACTERISTICS

PHYSIOGRAPHY

Area 17 is part of the Broad River estuary (a drowned river valley system) and is the largest of Sea Island Coastal Region estuaries (219 square kilometers). This estuary, which includes Broad River, Beaufort River, Port Royal Sound, and several tidal tributaries, includes an extensive system of marshes, tidal creeks, and sea-islands. The average depth of the estuary is approximately 7 meters at mid tide level. Broad, deep natural channels exist throughout Port Royal Sound, Beaufort River, and major tidal tributaries. Large shoal areas occur primarily in the Beaufort River and Port Royal Sound (NOAA, 1994).

Tides - Tides in Area 17 are semidiurnal, consisting of two low and high tides each lunar day. Mean tidal range at the mouth of Port Royal Sound is 7.0 feet during normal tides and 9.0 feet during spring tides. The greatest tidal ranges of the year typically occur around full moon during the months of September through December. There is considerable variation in the normal tide range due to the prevailing strength and direction of winds.

Rainfall - Rainfall data used in this survey is collected at a weather station located at the City of Beaufort WWTP (station 380559- Beaufort 7 SW). The rainfall gauge is typically read at approximately 7:00 AM and the rainfall amount is recorded for that date. As shellfish samples are typically collected after 7:00 AM, sample date + 24 hours data is included in the rainfall summary table. Rainfall for the sample date + 24 hours may correlate better and help to explain elevated fecal coliform concentrations in sample results, particularly if there was zero rainfall on the date of or prior to sampling.

Annual rainfall recorded at the Beaufort 7SW weather station was significantly below the 30-year normal amount for 2000 and 2001 (see Chart Beaufort Annual Rainfall). Below normal rainfall continued through May 2002 and by August 2002, the drought status of all 46 counties in the state, including Beaufort and Colleton, had been upgraded to extreme. Above normal rainfall beginning in late August, however, led the S.C. Drought Response Committee to downgrade the drought status statewide and remove the drought declaration for Beaufort, Charleston, and Colleton counties on November 21, 2002.

Normal annual rainfall is approximately 51.15", with August normally being the wettest month. A chart showing yearly rainfall amounts for the years 1997 through 2002 is attached. Approximately 40% of the annual rainfall falls in the three-month period from June through August. Weather patterns during this time period are often characterized by thunderstorms and shower activity of a short duration. In addition, these three months also have the highest numbers of days with rainfall greater than 1.00". The months of December through March historically have the greatest number of days with rainfall exceeding 0.10" and 0.50". Rainfall events during these months are typically of a longer duration.

Winds - The prevailing wind direction between February and September ranges between South and South Southwest (180 to 200 degrees) and between October and January is North Northeast (20 degrees). The annual mean wind speed is 8.5 MPH, with August having the lowest (7.3 MPH) and March the highest (10.0 MPH) mean wind speed.

River discharges - The salinity structure is primarily determined by the seasonal freshwater discharge from the Coosawhatchie and Pocotaligo Rivers and mean salinities vary less than 5 ppt between typical high and low salinity periods.

WATER QUALITY STUDIES

DESCRIPTION OF THE PROGRAM

The Department currently utilizes a systematic random sampling (SRS) strategy within Area 17 in lieu of sampling under adverse pollution conditions. In order to comply with NSSP guidelines, a minimum of thirty samples are required to be collected and analyzed from each station during the review period. Sampling dates are computer generated prior to the beginning of each quarterly period thereby insuring random selection with respect to tidal stage and weather. Day of week selection criteria is limited to Mondays, Tuesdays, and Wednesdays due to shipping requirements and laboratory manpower constraints. Sample schedules are rarely altered.

During July, 1998, an updated data analysis procedure was formalized. Samples utilized for classification purposes are limited to those samples collected in accordance with the SRS for a 36-month period beginning January 1 and ending December 31. This allows for a maximum of 36 samples

per station yet provides a six-sample "cushion" (above the NSSP required 30 minimum) for broken samples, lab error, breakdowns, etc. This also allows each annual report to meet the NSSP Triennial Review sampling criteria.

Six hundred and eighty-five surface water samples (<1.0 ft. deep) were collected for bacteriological analysis from nineteen active water quality sampling stations in Area 17 during the period 01/01/00 through 12/31/02. Of this total, Six hundred and eighty routine samples were collected and analyzed for classification purposes in accordance with the Department's systematic random sampling plan. No samples were collected on February 1, 2000 from stations 12A, 13, and 14 due to boat engine failure. No sample results were obtained for Station 22 on December 11, 2002. During previous reports, and in the department's GIS database, Station 24 was indicated at incorrect map coordinates. However, samples were collected at the intended location (Hazzard Creek at Second Right Bend above Stations #17 & 18). For data collected prior to 1998, mapping coordinates cannot be amended in the U.S. Environmental Protection Agency STORET system, therefore Station 24 was deactivated in the 2001 Annual Update and Station 25 (with proper map coordinates) was created at the identically described location. Data previously collected and labeled as Station 24, as well as data collected from Station 25 have been combined and summarized as Station 25.

The samples were collected in 120 ml amber glass bottles, immediately placed on ice and transported by bus to the South Carolina Department of Health and Environmental Control's Trident District Environmental Quality Control laboratory at North Charleston, South Carolina or the Low Country Environmental Quality Control laboratory at Beaufort, South Carolina. An additional 120 ml water sample was included with each shipment as a temperature control. Upon receipt at the laboratory, sample sets that exceeded a 30-hour holding time or contained a temperature control >10 degrees C. were discarded. Samples collected after September 1, 1986 have been analyzed using the five tube/three dilution modified A-1 method described by Nuefeld (1985).

Surface water temperatures were measured utilizing hand-held, laboratory-quality calibrated centigrade thermometers. Salinity measurements were measured in the laboratory using automatic temperature compensated refractometers. Additional field data include ambient air temperature, wind direction, tidal stage and date and time of sampling. Tidal stages were determined Nautical Software's Tides and Currents, Version 2 (1996).

MONITORING RESULTS

All Area 17 stations meet the statistical criteria for an Approved classification.

CONCLUSIONS

The review of fecal coliform bacteriological data in combination with the pollution source survey indicates that Area 17 is minimally and temporarily affected by two sources of actual or potential pollution.

NONPOINT SOURCE RUNOFF

Stormwater runoff appears to be the primary source of the minimal fecal coliform bacteria concentrations in Area 17. Possible sources of fecal coliform bacteria include septic systems, pets, domestic animals such as horses and cows, wildlife, and drainage from roads and freshwater wetlands.

INDIVIDUAL SEWAGE TREATMENT AND DISPOSAL SYSTEMS

Homes adjacent to shellfish waters in Area 17 are served by either ISTDs or sewer. Homes in older developed areas utilize ISTDs while most newer developments are tied into sewer. Soils in most areas are considered to be suitable for ISTDs and systems should operate properly if maintained.

RECOMMENDATIONS

No changes in harvest classification boundaries are recommended.

The shoreline survey and bacteriological data review of shellfish Management Area 17 indicates that no changes in classification boundary descriptions are appropriate. The following growing waters classifications in Area 17 will be (see Figure 3):

Prohibited: (Administrative closure)

1) USMC/Laurel Bay WWTP closure zone- Broad River, 2 miles north and south of the Outfall;
2) Archers Creek, from 1000 feet west of the bridge to Parris Island;
3) Hazzard Creek, from station 17-24 to the boundary of Area 17 at Highway 278.

Restricted/No depuration: None

Restricted:

Ballast Creek, from the boundary with Area 15 to its confluence with Broad River.

Conditionally Approved: None

Approved: The remaining waters of Area 17.

Station Addition/Deactivation/Modification: None

Analysis of sampling data for Area 17 demonstrates the probability of a significant impact from rainfall exceeding 4.00" in a 24-hour period. Therefore, a precautionary closure of area 17 will be implemented following rainfall events of greater than 4.00" in a 24 hour period, as measured at the City of Beaufort WWTP (Station 380559 - Beaufort 7 SW). This methodology is associated with the concept of the Probable Maximum Precipitation (PMP). PMP estimates for the coastal United States

have been published in a series of hydro-meteorological reports (HMRs) by the National Weather Service (*National Weather Service*). PMP estimates for South Carolina's growing areas are derived from HMRs 51, 52, and 53 (*National Research Council, 1985*).

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TABLE #1

Shellfish Management Area 17
WATER QUALITY SAMPLING STATIONS DESCRIPTION

Station	Description
01	Broad River at S.A.L. Railroad Bridge
02	Boyd Creek at Broad River
03	Broad River at Whale Branch
04A	USMC Laurel Bay WWTP Output (combined 04e&04f)
07	Mouth of Chechessee Creek at Chechessee River
08	Chechessee River Bridge
09	Mouth of Euhaw Creek at Hazzard Creek
10A	Archers Creek 1000 feet west of bridge
12A	Ballast Creek near Page Field Road Causeway
13	Broad River at Creek below Ballast Creek
14	Broad River at Parris Island Spit
16	Broad River at Corn Island - Mouth of Creek
16A	First Split in Habersham Creek above Station #16
17	Hazzard Creek at Chechessee River
18	Hazzard Creek at Chelsea Plantation Clubhouse
21	Confluence of Middle Creek and Whale Branch
22	Confluence of East and West Branch of Boyd Creek
23	Headwaters of Euhaw Creek one mile above Bolin Hall Landing
25	Hazzard Creek at Second Right Bend above Stations #17 & 18

(Total 19)

Figure 1.
Shellfish Management Area 17 Prior Classification

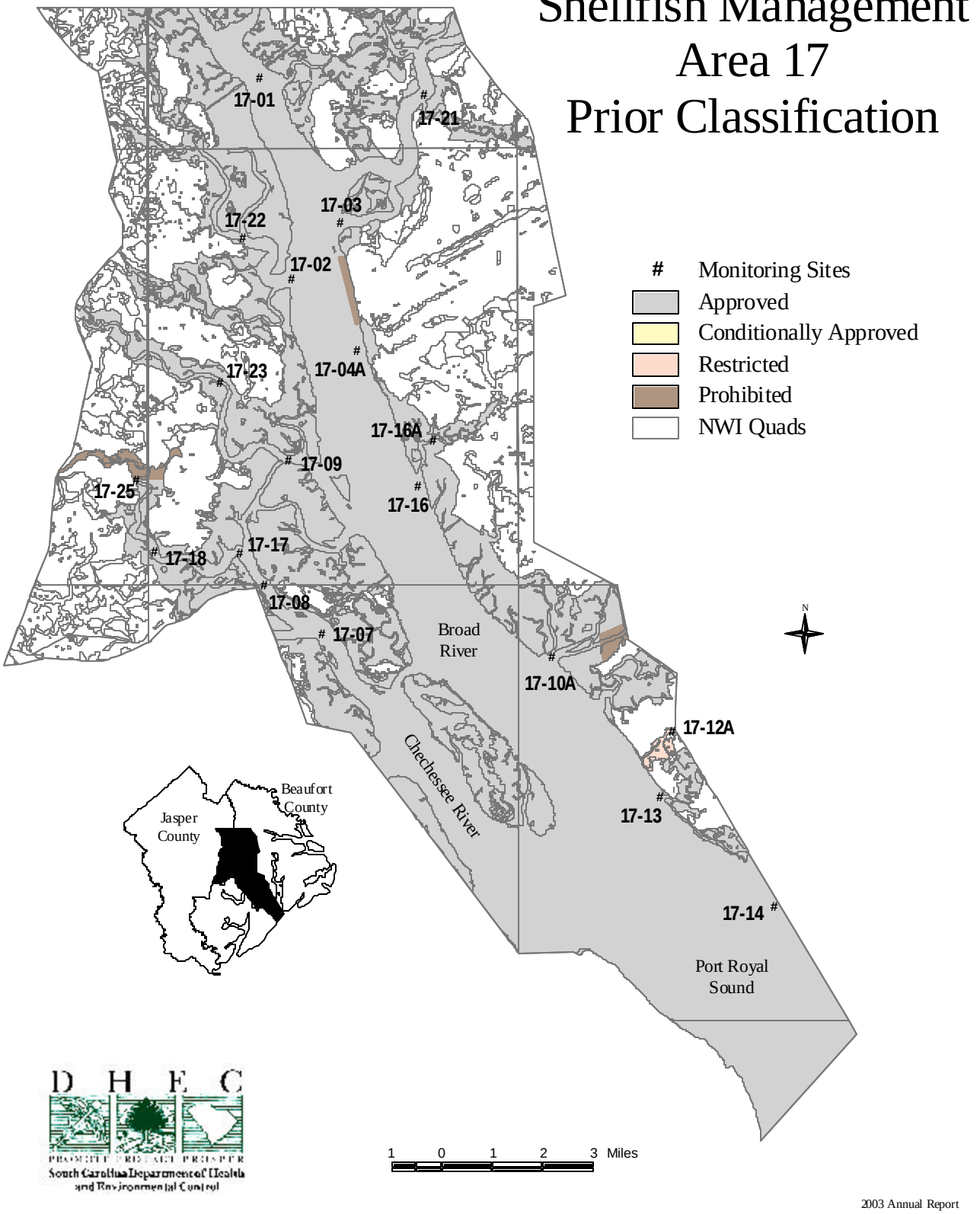

Figure 2.
Shellfish Management Area 17 Current Classification

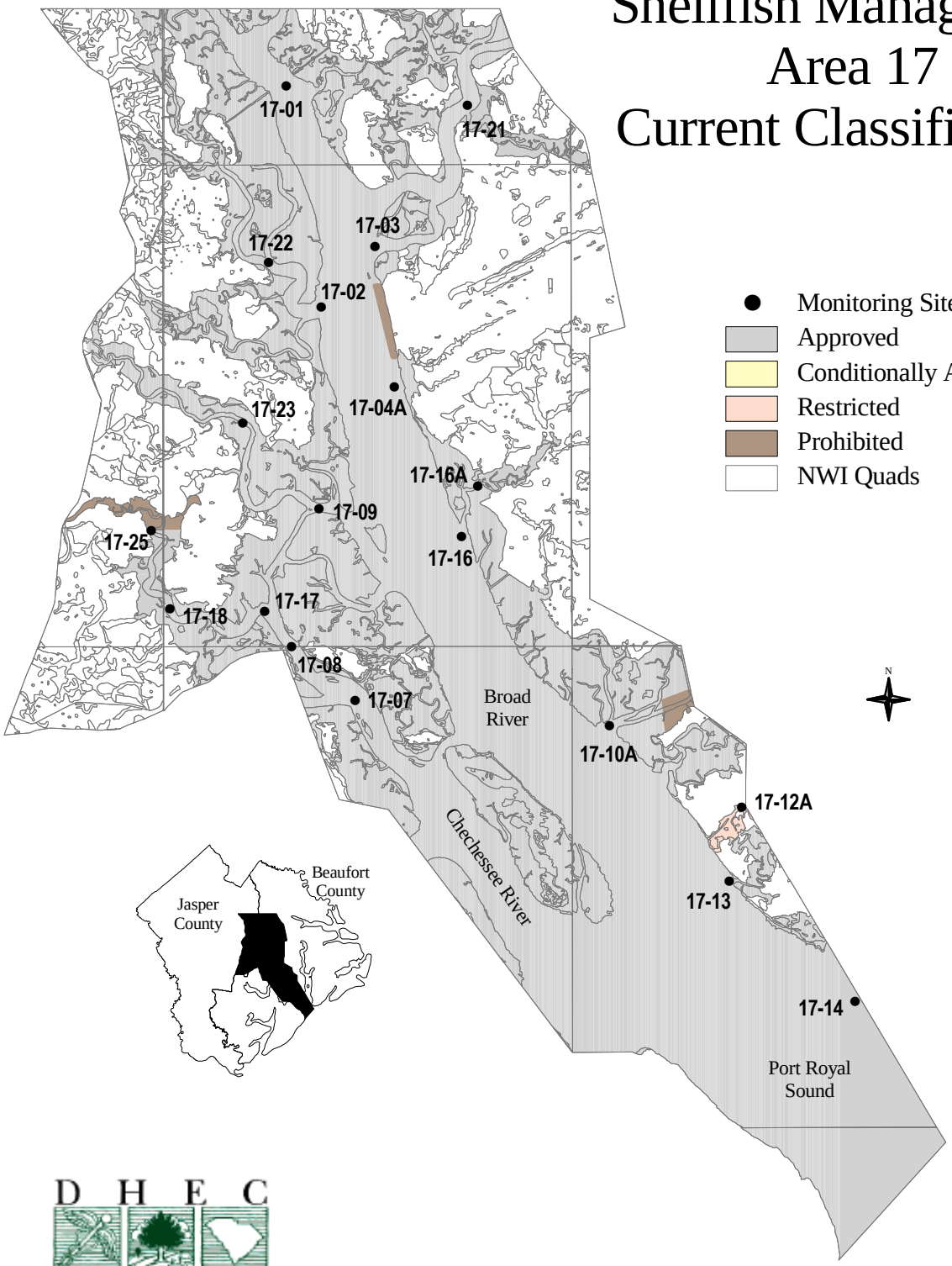

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Figure 3.

Shellfish Management Area 17

Potential Pollution Sources

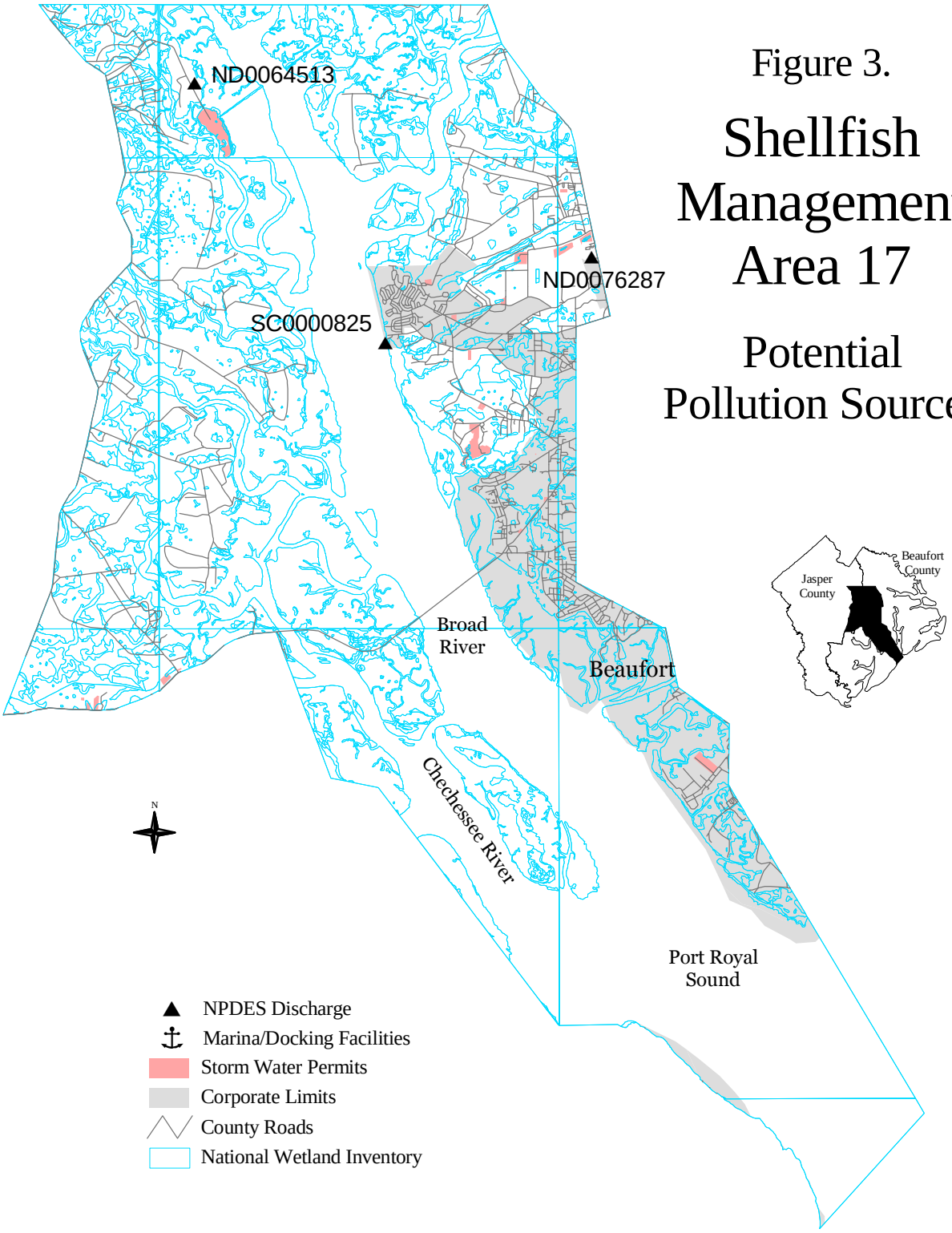

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TABLE #2

Shellfish Management Area 17
FECAL COLIFORM BACTERIOLOGICAL DATA SUMMARY
from Shellfish Water Quality Sampling Stations between

January 01, 2000 and December 31, 2002

Station #	1	2	3	4A	7	8	9	10A	12A	13	14
SAMPLES	36	36	36	36	36	36	36	36	35	35	35
GEOMEAN	2.9	2.8	3.0	2.7	3.0	2.8	2.9	2.4	2.3	2.3	2.2
90TH %ILE	6	6	6	6	9	8	6	4	4	4	3
WATERQLTY	A	A	A	A	A	A	A	A	A	A	A
CLASSIFICATION	A	A	A	A	A	A	A	A	A	A	A

Station #	16	16A	17	18	21	22	23	25			
SAMPLES	36	36	36	36	36	35	36	36			
GEOMEAN	3.6	5.5	3.4	4.1	3.9	2.4	3.3	4.7			
90TH %ILE	11	27	10	16	8	5	7	21			
WATERQLTY	A	A	A	A	A	A	A	A			
CLASSIFICATION	A	A	A	A	A	A	A	P			

Station #											
SAMPLES											
GEOMEAN											
90TH %ILE											
WATERQLTY											
CLASSIFICATION											

A - Approved **CA** - Conditionally Approved **R** - Restricted
RND - Restricted/No Depuration **P** - Prohibited

Table #3

Water Quality
Sampling Stations Data

Shellfish Management Area 17

BACTERIOLOGICAL DATA

Data for each shellfish station listed in this report's "Fecal Coliform Bacteriological Data Summary Table" and in other shellfish reports, can be obtained through South Carolina's Department of Health and Environmental Control - Freedom of Information office at the address below.

Freedom of Information
2600 Bull Street
Columbia, SC 29201

Any explanation or clarity needed on the report's content can be obtained by contacting the preparer(s), and/or reviewer(s) listed on the cover page.

TABLE #4

Rainfall Data

Shellfish Management Area 17

SOURCE : NOAA/National Weather Service
National Climatic Data Center, Asheville, North Carolina 28801

Shellfish Management Area 17
A SUMMARY OF RAINFALL
During and Prior To Fecal Coliform Sampling

Sample Date	Sample Date + 24 hours	Sample Date	Sample Date - 24 hours	Sample Date - 48 hours	Sample Date - 72 hours
01/11/00	0.00"	0.38"	0.01"	0.00"	0.00"
02/01/00	0.00"	0.00"	0.34"	0.41"	0.74"
03/15/00	0.00"	0.00"	0.00"	0.00"	0.00"
04/18/00	0.00"	0.00"	0.00"	0.00"	1.03"
05/08/00	0.00"	0.00"	0.00"	0.00"	0.00"
06/05/00	0.20"	0.47"	0.00"	0.00"	0.00"
07/19/00	0.00"	0.00"	0.00"	0.00"	0.00"
08/21/00	0.00"	0.00"	0.00"	0.41"	0.00"
09/25/00	0.00"	0.00"	0.00"	0.60"	0.00"
10/03/00	0.00"	0.00"	0.00"	0.00"	0.00"
11/06/00	0.01"	0.00"	0.16"	0.00"	0.00"
12/12/00	0.00"	0.01"	0.07"	0.93"	0.00"
01/17/01	0.03"	0.00"	0.00"	0.00"	0.00"
02/13/01	0.02"	0.06"	0.70"	0.06"	0.00"
03/21/01	0.00"	0.51"	1.05"	0.00"	0.00"
04/02/01	0.00"	0.00"	0.00"	0.03"	0.95"
05/22/01	0.05"	0.00"	0.00"	0.00"	0.00"
06/13/01	no data	1.30"	0.05"	0.05"	no data
07/11/01	0.00"	0.00"	0.00"	0.00"	0.00"
08/28/01	0.00"	0.00"	0.00"	0.00"	0.00"
09/18/01	0.00"	0.00"	0.00"	0.00"	0.00"
10/16/01	0.00"	0.00"	0.00"	no data	no data
11/06/01	0.00"	0.00"	0.00"	0.00"	0.00"
12/17/01	0.07"	0.00"	no data	no data	0.00"
01/09/02	0.00	0.00	0.00	0.00	0.00
02/04/02	0.00	0.00	no data	0.00	0.00
03/12/02	0.35	0.00	0.00	0.00	0.00
04/15/02	0.00	0.00	0.00	no data	0.04
05/06/02	0.00	0.00	0.00	no data	0.00
06/03/02	0.00	0.00	0.00	0.00	0.00
07/29/02	0.00	0.00	0.00	0.00	0.00
08/21/02	0.00	0.00	0.02	0.25	no data
09/17/02	0.00	0.00	0.56	0.9	no data
10/01/02	0.15	0.05	2.05	no data	no data
11/18/02	0.00	0.03	1.59	0.00	0.00
12/11/02	0.04	0.35	0.73	no data	no data

Amounts Shown Are per Day, not Cumulative / Station 380559 - Beaufort 7 - SW

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2000	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.12	0.00	0.00	0.00
3rd	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.25	0.00	0.00	0.07
4th	0.00	0.00	1.45	0.00	0.00	0.00	0.00	1.72	1.72	0.00	0.00	0.00
5th	0.16	0.00	0.12	0.00	0.00	0.47	0.00	0.53	0.37	0.05	0.16	0.00
6th	0.00	0.00	0.00	0.00	0.00	0.20	0.00	0.00	3.52	0.01	0.00	0.00
7th	0.00	0.00	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.01	0.00
8th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00
9th	0.00	0.00	0.00	0.27	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
10th	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.93
11th	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.07
12th	0.00	0.00	0.00	0.00	0.00	0.00	0.50	0.17	0.00	0.00	0.00	0.01
13th	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.03	0.00	0.00	0.00	0.00
14th	0.00	0.60	0.00	0.11	0.00	0.00	0.00	0.00	0.00	0.00	0.03	0.00
15th	0.00	0.87	0.00	1.03	0.00	0.00	0.15	0.00	0.00	0.00	0.00	0.02
16th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.01
17th	0.00	0.00	1.13	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.15	0.00
18th	0.01	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.83	0.00	0.00	0.00
19th	0.10	0.00	0.00	0.00	0.00	0.33	0.00	0.41	0.18	0.00	0.39	0.00
20th	0.17	0.03	1.51	0.00	0.00	0.36	0.00	0.00	0.00	0.00	0.70	0.09
21st	0.00	0.00	0.16	0.00	0.00	0.06	0.00	0.00	0.23	0.00	0.00	0.00
22nd	0.00	0.00	0.00	0.00	0.00	0.03	0.00	0.00	0.00	0.00	0.00	0.00
23rd	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.60	0.00	0.00	0.00
24th	0.29	0.00	0.00	0.00	0.00	0.05	0.30	0.00	0.00	0.00	0.00	0.00
25th	0.72	0.00	0.00	0.61	0.00	0.00	1.37	0.00	0.00	0.00	0.67	0.00
26th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.20	0.00
27th	0.00	0.00	0.00	0.00	0.38	0.00	0.00	0.00	0.00	0.00	0.00	0.00
28th	0.00	0.21	0.15	0.23	0.00	0.45	0.13	3.00	0.00	0.00	0.00	0.06
29th	0.74	0.00	0.00	0.00	0.00	0.40	0.00	0.00	0.00	0.00	0.00	1.44
30th	0.41		0.00	0.46	0.00	0.10	0.00	0.00	0.00	0.00	0.00	0.00
31st	0.34		0.38		0.00		0.63	0.00		0.00		0.00

(Monthly Figures) **Year's Rainfall Total: 37.82**

SUM	3.40	1.71	4.90	2.71	0.38	2.45	3.49	5.86	7.85	0.06	2.31	2.70
MAX	0.74	0.87	1.51	1.03	0.38	0.47	1.37	3.00	3.52	0.05	0.70	1.44
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.11	0.06	0.16	0.09	0.01	0.08	0.11	0.19	0.26	0.00	0.08	0.09

Note:"--" denotes missing data

(Shellfish Management Areas 14, 15, 16A, 16B, 17, 18, 19)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2001	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	--	0.00	0.00	0.00
2nd	0.00	0.00	0.00	0.00	0.00	--	0.04	0.00	--	0.00	0.00	0.00
3rd	0.00	0.00	0.03	0.00	0.00	--	0.02	0.00	--	0.00	0.00	0.00
4th	0.00	0.18	0.85	0.04	0.00	0.41	0.42	0.00	0.75	0.00	0.00	0.00
5th	0.00	0.08	0.02	0.00	0.00	--	0.59	0.01	1.30	0.00	0.00	0.00
6th	0.00	0.00	0.00	0.00	0.00	--	0.00	0.10	0.13	0.00	0.00	0.00
7th	0.00	0.00	0.00	0.00	0.00	--	0.00	0.00	0.23	0.25	0.00	0.00
8th	0.02	0.00	0.00	0.00	0.00	0.29	0.00	0.00	0.23	0.00	0.00	0.00
9th	0.31	0.00	0.00	0.00	0.00	0.24	0.00	0.00	0.02	0.00	0.00	0.48
10th	0.00	0.00	0.00	0.00	0.00	0.05	0.00	0.02	0.05	0.00	--	0.00
11th	0.00	0.06	0.00	0.00	0.00	0.05	0.00	--	0.00	0.00	--	0.63
12th	0.10	0.70	0.00	0.00	0.00	1.30	0.00	0.00	0.05	0.02	0.00	0.06
13th	0.09	0.06	0.77	0.00	0.00	--	1.06	1.58	0.00	--	0.00	0.00
14th	0.00	0.02	0.00	0.20	0.00	0.20	0.28	0.66	0.00	--	0.00	0.00
15th	0.00	0.00	0.15	0.00	0.00	--	0.00	0.00	0.00	0.00	0.00	--
16th	0.00	0.00	0.80	0.20	0.00	--	0.00	0.00	0.00	0.00	0.00	--
17th	0.00	0.11	0.00	0.00	0.00	--	0.00	0.00	0.00	0.00	--	0.00
18th	0.03	0.00	0.00	0.00	0.00	0.04	0.00	2.37	0.00	0.00	--	0.07
19th	0.00	0.00	0.00	0.00	0.00	--	0.00	2.30	0.00	0.00	0.00	0.00
20th	0.45	0.00	1.05	0.00	0.00	0.22	0.00	0.45	0.00	--	0.00	0.00
21st	0.00	0.00	0.51	0.00	0.00	0.11	--	1.02	0.00	--	0.00	0.00
22nd	0.00	0.03	0.00	0.00	0.00	0.00	--	0.00	--	0.00	0.00	0.00
23rd	0.00	0.35	0.00	0.00	0.05	0.04	0.03	0.00	--	0.00	--	0.00
24th	0.00	0.00	0.00	0.00	0.00	0.05	1.00	0.00	0.04	0.00	0.00	0.02
25th	0.00	0.00	0.01	0.00	0.00	--	1.10	0.00	0.90	0.00	0.03	0.00
26th	0.00	0.06	0.00	0.27	0.00	0.28	0.03	0.00	0.01	0.00	0.00	0.00
27th	0.00	0.00	0.00	0.00	0.00	0.28	0.08	0.00	0.00	0.00	0.00	0.00
28th	0.00	0.01	0.00	0.00	0.00	0.01	--	0.00	0.00	--	--	0.00
29th	0.00		0.21	0.00	0.00		--	0.00	0.00	0.00	0.00	0.00
30th	0.00		0.95	0.00	0.40		0.00	0.02	0.00	0.00	0.00	0.00
31st	0.80		0.03		0.00		0.00			0.00		0.00

(Monthly Figures) **Year's Rainfall Total: 32.02**

SUM	1.80	1.66	5.38	0.71	0.45	3.57	4.65	8.53	3.71	0.27	0.03	1.26
MAX	0.80	0.70	1.05	0.27	0.40	1.30	1.10	2.37	1.30	0.25	0.03	0.63
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.06	0.06	0.17	0.02	0.01	0.22	0.17	0.29	0.15	0.01	0.00	0.04

Note:"--" denotes missing data

(Shellfish Management Areas 14, 15, 16A, 16B, 17, 18, 19)

ANNUAL TABLE OF DAILY RAINFALL DATA

SOURCE: City of Beaufort Wastewater Treatment Plant

Beaufort, SC (Station #380559 / 7-SW)

2002	JAN	FEB	MAR	APR	MAY	JUN	JUL	AUG	SEP	OCT	NOV	DEC
1st	0.00	0.00	0.00	2.60	0.00	0.00	--	0.81	0.65	0.05	0.00	0.00
2nd	0.10	0.00	--	0.00	0.00	0.00	0.00	0.02	0.06	0.15	0.00	0.00
3rd	0.50	--	--	0.00	0.00	0.00	0.00	--	0.16	0.00	0.00	0.00
4th	0.08	0.00	0.05	0.00	--	0.00	0.00	0.02	0.00	--	0.00	0.00
5th	--	0.00	0.00	0.00	0.00	0.00	0.00	--	0.00	--	0.25	0.00
6th	--	0.02	0.00	0.00	0.00	0.00	0.01	0.00	0.00	0.00	0.78	0.13
7th	0.00	1.01	0.00	0.00	0.00	0.00	--	0.49	0.00	0.02	0.04	--
8th	0.00	0.25	0.00	0.02	--	0.00	0.00	0.00	0.00	0.00	0.00	--
9th	0.00	0.00	0.00	0.07	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--
10th	0.00	0.27	0.00	0.41	0.00	0.00	0.28	0.00	--	1.85	1.12	0.73
11th	0.00	0.15	0.00	0.04	0.00	0.00	0.00	0.00	0.00	--	0.00	0.35
12th	0.00	0.00	0.00	--	0.00	0.00	2.16	0.00	0.00	0.04	1.20	0.04
13th	--	0.00	0.35	0.00	0.00	0.00	--	0.00	--	0.04	0.89	0.56
14th	0.00	0.00	0.00	0.00	0.11	0.00	0.60	0.07	0.90	0.05	0.00	0.03
15th	0.40	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.56	0.02	0.00	0.00
16th	0.00	--	--	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
17th	0.00	--	--	0.00	0.00	--	0.00	--	0.00	0.00	1.59	0.00
18th	0.00	0.00	0.03	0.00	0.00	0.02	0.00	0.25	0.22	0.00	0.03	0.00
19th	--	0.00	0.00	0.00	1.10	0.63	0.00	0.02	0.16	0.00	0.00	0.04
20th	--	0.00	0.00	0.00	0.00	3.85	--	0.00	0.11	0.00	0.00	0.20
21st	0.00	0.21	0.18	0.00	0.00	1.21	1.97	0.00	0.00	0.00	0.00	0.02
22nd	0.10	0.00	0.20	0.00	--	0.01	0.00	0.00	0.58	0.00	0.09	0.00
23rd	0.01	0.01	0.00	0.00	0.00	0.76	0.85	0.00	1.20	0.00	0.00	0.00
24th	0.00	0.04	--	0.00	0.00	0.92	0.01	0.04	0.00	0.09	0.00	0.08
25th	0.01	0.00	0.00	0.00	--	0.78	0.60	0.84	0.84	0.09	0.00	1.33
26th	0.14	0.00	0.00	--	0.00	0.01	0.00	0.30	0.51	0.00	0.00	0.00
27th	0.00	0.00	0.48	--	0.00	0.00	0.00	--	--	0.00	0.00	0.00
28th	0.00	0.00	0.00	0.00	0.00	0.00	0.00	--	--	0.49	0.00	0.00
29th	0.00		0.00	0.00	0.00		0.00	2.23	2.05	0.38	0.00	0.00
30th	0.00		0.00		0.00		0.00	1.50		0.00	0.00	0.00
31st	0.00		--		0.00		0.00					0.00

(Monthly Figures) **Year's Rainfall Total: 50.97**

SUM	1.34	1.96	1.29	3.14	1.21	8.19	6.48	6.59	8.00	3.27	5.99	3.51
MAX	0.50	1.01	0.48	2.60	1.10	3.85	2.16	2.23	2.05	1.85	1.59	1.33
MIN	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
AVG	0.05	0.08	0.05	0.12	0.04	0.30	0.24	0.26	0.32	0.12	0.20	0.13

Note:"--" denotes missing data

(Shellfish Management Areas 14, 15, 16A, 16B, 17, 18, 19)